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CEREBRO-SPINAL MENINGITIS:

AN ARTICLE PREPARED FOR THE

KENTUCKY STATE MEDICAL SOCIETY,

MARCH, 1874.

By E. S. GAILLARD, A. M., M. D., LL.D.

PROFESSOR PRINCIPLES AND PRACTICE OF MEDICINE IN THE LOUISVILLE MEDICAL COLLEGE, KY.;
LATE PROFESSOR PATHOLOGY AND PATHOLOGICAL ANATOMY IN THE MEDICAL COLLEGE
OF VIRGINIA; IN THE KENTUCKY SCHOOL OF MEDICINE; IN THE CUMBERLAND
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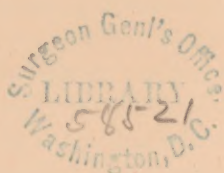
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CEREBRO-SPINAL MENINGITIS.

Mr. President and Gentlemen of the Kentucky State Medical Society:

In presenting briefly to your attention the subject of cerebro-spinal meningitis, I propose to confine myself chiefly to a consideration of demonstrated or demonstrable facts; for the disease has in recent years been so much discussed, both verbally and by the press, that any comprehensive or elaborate mode of treating the subject here would of course be impracticable. It would require the space of a large volume rather than that offered by these few pages were I to attempt to analyze most or even a material part of what has been presented. I shall therefore not seek to cultivate so extensive a field, or to allude to the infinite questions of either historical or speculative interest connected with it, but shall endeavor to confine myself chiefly to a presentation of facts.

Name.—It is rarely that a disease is as happily and correctly named; and the name now used shows not only that the disease has been very properly removed from the endless catalogue of what are vaguely termed fevers, but that it is definitely referred to the definable class of absolute inflammations.

Definition.—While many, after the fashion of Aitken, Clymer, and others, have sought to furnish a definition of the word cerebro-spinal meningitis, and in seeking to accomplish their purpose have given but descriptions multiplex and almost interminable, it must be admitted that such a system of study in this disease (and in all diseases) is faulty and injudicious. Is it not much better, in accordance with an older and better usage, to select for a disease a name so indicative of its prominent manifestations as to give to the disease an indisputable individuality, and then, repudiating in the definition the endless enumeration of its chief characteristics, to elaborate all such details

in connection with its symptomatology? Adopting then the older rather than the modern method of definition, the definition of the term cerebro-spinal meningitis is given here as follows: A disease usually epidemic, and characterized as a rule by inflammation of the meninges of the brain and spinal cord.

History.—Contrary to opinions widely entertained, this disease is one of the oldest described in the medical literature of the past four centuries, and while, like diphtheria, the scenes and periods of its epidemic visitations have been so often and so widely separated as to cause the very existence of the disease to be forgotten, or to appertain apparently to past rather than to contemporaneous medical literature, still it is a fact that its existence can, for at least four centuries, be distinctly traced, both in Europe and America, wherever medicine has enjoyed a literature, or where medical subjects have been the themes even for tradition.

It has prevailed in all seasons, climates, ages, sexes, and conditions. The quiet days of the balmy spring-time bring no exemption from its visitations; when nature at this time speaks not of death, but only of life, or the renewal of life, when her green veil covers with its deceptive illusions the death records which the previous season has left in its trail, even then, in a season so peaceful and joyous, this disease has made desolate the hearthstone, and brought the pallid hue of fear to the cheek of the bravest and the best. It has destroyed with no less ruthless violence in midsummer and in the harvest-time of bountiful autumn; and when icy winter locks up in its frigid embrace inland streams and rivers, when even the sea dashes its ice-crystal foam upon the frozen beach, this disease has sent its myriads to the cemetery, and with the gentle snow beautifully carpeting recent graves has taught us that this destroyer claims all seasons for its own. Rural hamlets and regal residences, the abodes of poverty and the courts of the rich, have all been the scenes of its fell visitations. It has desolated frozen Russia; it has stricken unhappy Poland; it has substituted wailing for mirth amid the festal scenes of vine-clad Italy. Africa has not escaped. It has devastated the villages of the Ganges and mountain-cottages perched upon the highest peaks of the Himalayas. China and India have been visited. The English, the Irish, and the Scotch have all testified to its fatal horrors. It has made the mercurial French feel that there is desolation as well as festivity,

that there is mourning as well as dancing for a nation. The Spaniards have had this disease added to the long catalogue of their familiar and great misfortunes. In America it has been seen every where; in her cities, towns, and villages; in cottages perched on mountain eminences; in the alluvial regions of seas, lakes, and rivers; on vast prairies, and wherever the restless American has sought to establish for himself "a local habitation and a name." Its victims are of all ages and of both sexes. It has robbed the cradle of its gentle and tender occupant even in the first month of the infant's painful life. Puberty, adolescence, and old age offer no exemption to its ravages; and while the male oftener suffers, the female enjoys in epidemics not even an exceptional immunity. It has raged with peculiar violence in armies, and during the late war military camps and stations were almost decimated by its violent visitations. Troops encamped in the snow-covered fields of desolated Virginia suffered; those about the sea-coast cities were scourged. The western armies distributed along the Mississippi, and even amid the wild regions of Texas, were terribly stricken. Its history thus shows that it has prevailed for centuries, and in all seasons, climates, ages, sexes, and conditions. It seems to be an impartial scourge—a destroyer that has no favorites; though the quaint Plieffer states, in his quaint way, that "it prefers winter, soldiers, and children."

Such are briefly some of the chief points connected with its history.

Pathology.—Naturally enough, the physician is almost exclusively interested in its pathology, for the modern science of medicine demonstrates in myriad ways that a rational and reliable pathology forms the surest if not the exclusive solution to the difficult problem of practice. For while Niemeyer and many of his school and his admirers would so carry medicine back to the dark ages of its history as to teach that practice rests upon observation and experience, he was, though a great man, not great enough to fasten this heresy upon the genius of modern medicine. Modern practice walks ever in the wake of modern pathology, even as success treads in the footprints of investigation, and as triumph erects its banner over each field of discovery.

It is but natural then that the pathology of this disease should have been patiently and unweariedly studied. The scalpel, the retort, and

the microscope (forming that Pythian tripod upon which rests the hope of medical science) have all been laboriously used, and the results form the chief facts of interest and value connected with this malady. It has unquestionably been demonstrated that the pathology of the disease is strictly the pathology of an inflammation involving the coverings of the brain and spinal cord. Post-mortems have demonstrated that death may occur in any of the three stages of inflammation; viz., as the result of sudden or prolonged or malignant congestion; as the result of effusion; or as the result of suppuration. All of the symptoms are generally referable to one or more of these three conditions; and while ingenious medical sophists would strive to make a mystery of one form of this disease, and with dramatic exaggeration term it the fulminant or thunderbolt form of cerebro-spinal meningitis, it is a fact that under the strongest magnifying powers the tissues of those thus destroyed have usually manifested evidences of sudden and marked congestion. It is safe and tenable then to regard the pathology of this disease as an inflammation of the meninges of the brain and cord, induced by causes whose study belongs properly to another and the next section of this paper.

Etiology.—In endeavoring to present chiefly the facts connected with this disease, it is proper to acknowledge that there is but little which can be reliably given as to its exclusive or specific etiology. One statement at least may be accepted as a fact; viz., that the disease is neither infectious nor contagious. This fact rests upon a broad and impregnable basis—the concurrent testimony of almost every observer and practitioner. What may be either the original or usual cause is a theme as yet for speculation and investigation. As to the alleged cause so often stated—viz., an epidemic condition of the atmosphere—this simply conveys us back to the speculative and perhaps even to the dark ages of medicine. It means nothing tangible, nothing tenable, nothing satisfying, convincing, or even comprehensible. The explanation is like Othello's description of his purse: "'Tis something—nothing." In the domain of fact it has no place; in the temple of truth there is no niche small enough to suit its diminutive and pigmy proportions. It is better to say then that the cause of cerebro-spinal meningitis is apparently some poison which contaminates the blood, and which, like many poisons, produces a definite and characteristic inflammation.

Sporadic and Epidemic Prevalence.—While this disease most usually prevails epidemically, it does occasionally prevail sporadically. Its epidemic tendencies are, however, sufficiently uniform to justify one in stating, among the facts characterizing the disease, that it chiefly prevails as an epidemic. Its epidemic manifestations and tendencies are conspicuous. Indeed Upham states that “horses and cows appear to have been affected; after these, hens and chickens, and in some instances dogs and cats.” That cerebro-spinal meningitis prevails most generally as an epidemic may therefore be accepted as one of the facts appertaining to the disease.

Symptoms.—There is exceptionally a chain of symptoms well marked and familiar—malaise, anorexia, mental and physical inertia, cephalalgia and rachialgia, chill with marked fever. Most frequently, however, the disease appears without any of these familiar manifestations, the patient being often seized without any premonition. There is a rigor, or a chill, and fever soon supervenes; with the fever there is almost always intense headache, occasionally frontal but usually occipital in character—the headache in this disease being generally exceedingly severe. There are joint pains and severe spinal pains, with some tenderness along the spine. The skin is variously affected; generally dry; it is occasionally bathed in profuse, persistent, and offensive perspiration. With either the dry or damp surface, hyperæsthesia of the skin is often very decided. The patient is usually exceedingly restless; indeed in some instances this amounts to almost uncontrollable jactitation. The pupil is sometimes contracted, sometimes dilated. In the first stage of the disease, unless the congestion is extreme, the pupil is usually enlarged; it may be contracted. When effusion and suppuration have occurred it is generally distinctly dilated. The temperature is very variable. Many cases die with the temperature below 100° F. Occasionally it reaches 105° F. While a high temperature is of course indicative of great danger, a temperature of 100°, or even less, does not by any means (unless coincident with other favorable symptoms) betoken a good result.

The bowels are usually constipated; the tongue is furred, covered usually with a tenacious, pasty fur. The urine is scanty, rarely albuminous, of high specific gravity, and depositing uric-acid crystals and amorphous urates freely. Nausea and vomiting are generally present and persistent. These symptoms, as is usual in most cases of cerebral

trouble, are not relieved by free emesis, either induced or spontaneous. Delirium is frequent and peculiar. Unlike that of typhoid and typhus fevers, it disappears to a material extent when the patient is aroused; but as soon as again left alone he speedily relapses into that wandering, dreamy delirium so peculiar and so almost characteristic. As the disease advances, the marked retraction of the head increases, and not infrequently with this increase there is marked opisthotonos. While some have regarded this condition as voluntary, the patient seeking thus to relieve the efferent nerves of the cord from pressure, there can be no doubt that this muscular contraction is involuntary and spasmodic in character, the spasms sometimes being clonic and sometimes tonic and even tetanic in character.

The pulse is exceedingly variable; usually feeble, irregular, and very frequent. Sometimes it is markedly intermittent in character, these intermissions being often preceded or succeeded by violent and tumultuous action of the heart. The respiration is usually shallow and frequent, becoming at times much disturbed, irregular, sighing, or gasping in character. The joint pains in some instances are very troublesome, and occasionally they are nomadic in their manifestations, passing from joint to joint, leaving as a rule (unlike the rule in rheumatism) no traces behind them. In rare instances, however, these wandering pains foreshadow a distinct hydrarthrosis or dropsical effusion into the joints.

While many have termed this disease spotted fever, from the dark-red or purplish spots often seen on many portions of the body, these spots are now properly regarded as only one of the manifestations of the blood-poison, causing or coincident with the disease. This fact is unquestioned, for in a large proportion of cases these spots do not appear. When apparent they may be regarded as usually indicative of serious results. The nerves of special sense are seriously disturbed. In some cases the functions of taste, hearing, vision, smelling, and occasionally of tactile sensibility are perverted, impaired, or even destroyed. Occasionally herpetic eruptions are seen, and in a few instances an extensive eczema. In many cases there are grave disturbances and lesions of the nervous system. Sometimes the resulting paralysis has been only temporary, the immediate result of blood-poisoning. In other cases the paralysis has been permanent, due to some organic lesion; as the result of vascular rupture or tissue-

change, etc. These manifestations of paralysis are sometimes indicative of trouble occurring in the anterior portion of the cord, producing varied and various impairments of motion. Sometimes the posterior portion of the cord is implicated, resulting in curious and manifold disturbances of sensation. Often the cranial nerves are implicated, producing varieties of strabismus, with serious impairment of the functions of the special senses. Most of these impairments, disturbances, and injuries of the nerves, either of the cranium or cord, foreshadow a fatal result.

In one case, seen in consultation with the Secretary of this Society, Dr. Larrabee, there was a regular series of these nervous disturbances manifested—unilateral paralysis, paraplegia, strabismus, loss of taste, hearing, vision, disturbances of deglutition, followed by prolonged asthenia—death occurring in the fifth month of the attack.

In many cases death occurs from asthenia; in some from early nervous exhaustion; in some from the immediate prostration caused by the blood-poison; in some from cerebral or spinal lesion; and in many from the immediate effects of the inflammatory fever, with coincident loss of sleep, rest, and the blood-making power.

Treatment.—Every conceivable treatment has been adopted in this disease. Almost every variety has been successful, and almost every variety has failed—venæsection general and local, cupping dry and wet, calomel in all doses, purgatives, opium, quinine, ergot, atropia, gelseminum, aconite, cypripedium parviflorum, the calabar-bean, bromide of potassium, hydrate of chloral, ice to the head and spine, counter-irritation of every kind from the mildest stupes to the actual cautery, irrigation of the head, cold baths, hot baths, etc. Each and all of these methods of treatment have had their enthusiastic advocates. All have at times succeeded, and all have at times failed. Their advocates have almost all been in turn elated with hope, and then cast down by failure and repeated disappointment. It is certainly a fact, to be mentioned in this paper, that no method of treatment indiscriminately used has succeeded or will succeed. It must be the settled conviction of the wisest and the most judicious that any thing like a special or even routine treatment should be abandoned, and that the physician in this disease, as in all others, should be the rational practitioner; that he should remember he is dealing with an inflammation, and should act accordingly. It may

therefore be correctly said that while the best treatment, in the best hands and applied always at the correct time, must be largely unsuccessful, the treatment of this disease should have always a decided and uniform relation to the stage of the inflammation existing at the time. While blood-letting, cold affusions, mild purgatives, ergot, atropia, gelseminum, aconite, bromide of potassium, etc., may be distinctly indicated in the first or congestive stage of the inflammation, they must necessarily be very injurious, if not fatal in their results, if used after suppuration or extensive effusion has occurred. To systematize the treatment, it is respectfully suggested that in the early stages of the inflammation cautious blood-letting, either general or local, may be used, with cold applied externally, and with the use of such remedies as are known to relieve the vascular tension of the blood-vessels; these medicines being (as is well known by all) as follows: the preparations of ergot, atropia, the calabar bean, bromide of potassium, aconite, gelseminum, etc. Counter-irritation or stupes may be applied to the neck and spine. Mild cathartics, with gentle stimulation of the functions of the liver and kidneys, are also applicable at this period. Low diet, quiet, the securing of sleep by hypnotics (other than the preparations of opium) should at this time claim the attention of the practitioner. This is really the only stage of the disease in which the physician can reasonably expect to accomplish any material benefit. Subsequently the use of quinine, the cautious use of stimulants, the systematic administration of nutritious diet, the securing of sleep and rest, etc., represent about all that can be done. Where effusion has occurred, and the patient does not succumb, the use of absorbents, external and constitutional, should of course be persistently tried. The patient thus treated is at least rationally treated, and the percentage of success will be found equally as good as that manifested under any method of treatment possible.

Mortality.—This varies in different epidemics and in different seasons and localities. It has varied from fifteen to eighty-five per cent. The average mortality is between forty and sixty per cent. The mortality is often greater even than that of Asiatic cholera.

Duration.—The disease varies in duration from one day to many months. Most patients die or are convalescent during the first week.

Diagnosis.—The diagnosis is not difficult—fever; severe occipital headache; nausea and vomiting, persistent and usually irremediable;

the retraction of the head; the peculiar delirium, with the absence of all typhus and typhoid phenomena; the purple spots; frequent cutaneous hyperæsthesia; pain referred to the spine and neck, with tenderness over the cerebro-spinal axis; these symptoms make up a picture complete and unmistakable.

Necropsy.—The post-mortem phenomena are well known and generally uniform—evidences of distinct congestion, or the results of great congestion; the usual phenomena of acute inflammation, plastic lymph, suppuration, adhesions, at times effusion into the ventricles. The base of the brain, as a rule, gives the greatest evidence of destructive inflammation. Of the meninges, the pia-mater is chiefly and most seriously involved.

Convalescence.—While occasionally this is uninterrupted, as a rule recovery is not only slow, but marked by frequent interruptions, and sometimes by dangerous complications. Every fact on record shows thus the extreme danger, as well as the extreme interest and importance of this horrible disease.

Trichocephalus-dispar.—In closing this paper there is perhaps as good an opportunity as could be offered of calling attention to a



[MAGNIFIED TEN DIAMETERS.]

singular incident occurring in a case attended by Dr. Larrabee, and at his request seen with him. The patient was the little boy to whom reference has been made in this paper as having suffered a series of nervous lesions, and having died about the seventeenth week of his attack. The mother of the child, seeing in his discharges a number of small moving objects, had the curiosity to examine a few of them carefully, and gave two of them to Dr. Larrabee and myself. One of these animated bodies was, through the courtesy of Dr. Kastenbine, examined with the microscope. After this examination he carefully made a correct drawing of the object examined. I had several excellent photographs of this drawing taken, and an engraving of it made. As will be seen, it is a picture of an entozoön, one seldom seen in the

United States, the *trichocephalus-dispar*. Watson, Wood, Tanner, Dunglison, Dickson, Roberts, Aitken, and Trousseau make no mention of its having ever been seen in this country. Dr. Austin Flint states he has not infrequently seen it in making post-mortems of those dying from typhoid fever.

While this parasite has been often seen in England, France, Italy, Egypt, and Ethiopia, it is believed that few American physicians have had the opportunity of seeing either the worm itself or a correct picture of it. There is a somewhat amusing incident connected with its history. It was at first supposed that the hair-like projection seen was the tail of the entozoön, and accordingly it was christened the *trichinalis*, or hair-tail. Subsequently the curious in such matters discovered that what was supposed to be the tail is really the head of the parasite. Consequently the creature is now known as the *trichocephalus-dispar*, or hair-head.

It is believed that the specimen photographed is below the medium size and length, and is most probably a specimen of the entozoön which had not arrived at maturity. As small as is the creature, it is known to propagate by oviparation; the eggs being oval with resisting shells, each having a diameter of the $\frac{1}{16}$ of an inch. Its habitat is usually the cæcum. It is said that this parasite is frequently seen in Paris, and it is probable that those of our countrymen who have spent much time abroad may be quite familiar with it.

NOTE.—I am aware that this paper is very imperfect. It has been prepared only because the preparation of it was promised. It was prepared almost at one sitting, and during a series of prolonged interruptions.

